



Article: Concerning a Scottish Melody. The Issue of Tonal Centers in Anhemitonic Pentatonic Scales

Author(s): Vincenzo Caporaletti

Source: *RJMA – Journal of Jazz and Audiotactile Musics Studies*, English Section, No. 2, December 2020

Published by: Centre de Recherche International sur le Jazz et les Musiques Audiotactiles (CRIJMA), Institut de Recherche en Musicologie (IReMus), Sorbonne Université

Stable URL:

<https://api.nakala.fr/data/10.34847/nkl.88achsk1/7c40960a11401619aebc9b50fd49f95d07d989b3>

RJMA (*Revue d'études du Jazz et des Musiques Audiotactiles*) is an international multilingual scientific journal whose present first issue is presented in four languages simultaneously (French, Italian, Portuguese and English), through four Sections, or “Cahiers”.

The complete set of “Cahiers” is available online at: <https://www.iremusc.cnrs.fr/fr/collections-revues/revue-detudes-du-jazz-et-des-musiques-audiotactiles>

How to cite this article:

CAPORALETTI, Vincenzo, “Concerning a Scottish Melody. The Issue of Tonal Centers in Anhemitonic Pentatonic Scales”, *RJMA – Journal of Jazz and Audiotactile Musics Studies*, English Section, No. 2, CRIJMA – IReMus – Sorbonne Université, (December) 2020, pp. 1-18. Available at:

<https://api.nakala.fr/data/10.34847/nkl.88achsk1/7c40960a11401619aebc9b50fd49f95d07d989b3>

Concerning a Scottish Melody. The Issue of Tonal Centres in Anhemitonic Pentatonic Scales

Vincenzo Caporaletti

This paper is aimed at bringing to light and if possible clarifying a significant epistemological discordance in the theorisation of five-note anhemitonic scales, commonly referred to as pentatonic or pentaphone.¹ A dividing line in fact runs between the ethnomusicological conception of these scales (in Europe in particular, largely traceable to Brăiloiu and Arom and their influence on the Italian-French school) and the theorisations that have emerged above all in jazz studies (and as a consequence in theoretical formalisations of rock and pop music, which have gained particular resonance in the mass media, and are in turn similar to the positions found in Anglophone ethnomusicology).

The need to clarify the taxonomy of pentatonic scales, comparing the various outlooks, is justified not only by a desire to further academic knowledge – attempting to lay bare the set of problems involved and work towards a possible solution – but also concerns more down-to-earth educational and pedagogical considerations.

Indeed, from an ethnographic point of view, it is abundantly clear² that the vast majority of musicians whose knowledge of pentatonic scales comes from the educational literature used in conservatory jazz courses (not only in Italy) find the theoretical explanation of anhemitonic pentatonic scales offered by a significant part of the ethnomusicological tradition *incomprehensible*. This situation is neither academically acceptable nor pedagogically beneficial: the existence of a “double truth” must at the very least encourage us to become explicitly aware of the terms of the problem (and, if possible, to find a solution).

So, what are the basic terms of this interpretational discrepancy (leaving a discussion of its causes to our conclusions)? The epistemological divide in question concerns the existence or inexistence of a tonic function in anhemitonic pentatonic scales. The position maintained by Brăiloiu and Arom (both well-received in Italian and French ethnomusicological schools) denies this possibility, or reduces it to a more or less accentuated polarisation that in any case is marked by a huge degree of uncertainty. This is a *scalar* conception, one could say, of the pentatonic system. The other school of thought is instead *modal*; it fully recognises the tonic function and thus considers pentatonic scales as modes, each built on a different degree of the scale. Just as in ancient modality or modernist neo-modality, or again in the modal structure found in jazz theory, from this point of view these five-note scales define, via permutations of the tonic, i.e. alternatively taking each note of the scale as a tonal centre, an equal number (five) of modal aggregates each having a distinctive functional quality of sound and specific intervallic features.

¹ For a critical comment of my own on these scalar aggregates, concerning in particular the opposition between *Tonleiter* and *Tonweise* and an ontological discussion of modality, cf. VINCENZO CAPORALETTI, *La forma groovemica di Spinning Plates del Broken Arm Trio*, «Per Archi», n. 5, 2010, p. 129-146. Here, we will deal with the problem of modes exclusively as scalar aggregates, only indirectly mentioning their melodic aspects.

² The decades I have spent teaching jazz improvisation and theory unequivocally confirm this.

It must be said that this opposition remains within a *scalar type* of taxonomical criterion, instead of understanding modes as types or melodic formulas, according to a *melodic typology*.³ Returning to the set of problems as a whole, the most recent case that has come to my attention – with which we will begin our discussion – is a study published by one of the leading figures in contemporary ethnomusicology, Simha Arom. In 1997, this scholar dedicated an important essay to African pentatonism, which was translated into Italian in 2013.⁴ Let us begin by taking a look at what this outstanding scholar maintains.

2013, Simha Arom

As part of his research on African pentatonism, in this case regarding the issue of variable intonation for certain degrees, Arom sets out a theory of this scalar system. One excerpt in particular unequivocally indicates his theoretical perspective.

*The pentatonic system allows for five non-hierarchical modalities of scalar organisation, which Brăiloiu describes as “pentatonic modes” and which correspond to the various distributions made possible by the sequence of these intervals.*⁵

Arom emphasises the adjective «non-hierarchical», meaning that these scalar organisations are not to be considered as “modes”, provided with a modal tonic. He adds: «to avoid any confusion with the many meanings given to the term “mode”, we will call the various distributions of intervals *types* or *configurations*».⁶ One must note that the term *configuration*, in particular, comes from the semantic field of *description* in linguistic phonetics, as opposed to systemic *structuring* in phonology. Furthermore, the ethnomusicologist seems to confirm the position of Brăiloiu on the basis of important experimental results he obtained in a research on the perception of pentatonics by the Aka Pygmies, conducted in 1993.⁷ We will come back to this.

In other words, Brăiloiu’s criterion for classification must be interpreted according to various sequential distributions of the sounds that make up one basic series, without the poles of attraction that define modal structures.

I.	Sol	La	Si	Re	Mi	(Sol)	
	II.	La	Si	Re	Mi	Sol	(La)
		III.	Si	Re	Mi	Sol	La (Si)
			IV.	Re	Mi	Sol	La Si (Re)
				V.	Mi	Sol	La Si Re (Mi)

Example 1. The five configurations of the pentatonic scale in Brăiloiu’s classification

³ HAROLD S. POWERS, *Mode*, in *The New Grove Dictionary of Music and Musicians*, ed. by Stanley Sadie, vol. 16, London, Macmillan, 1980, p. 775-860: 830.

⁴ SIMHA AROM, “La ‘sindrome’ del pentatonismo africano”, in *Le ragioni della musica. Scritture di musicologia africanista*, ed. by Maurizio Agamennone and Serena Facci, Lucca, LIM, 2013, p. 141-166. See also the discussion in Francesco Giannattasio, *Le pentatonisme africain en tant qu’ « univers du discours »*, «Musica Scientiae», Discussion Forum 1, 2000, pp. 73-81.

⁵ AROM, *La ‘sindrome*, cit., p. 144.

⁶ *Ibid.*

⁷ SIMHA AROM and SUSANNE FÜRNISS, *An interactive experimental method for the determination of musical scales in oral cultures. Application to the vocal music of the Aka Pygmies of Central Africa*, «Contemporary Music Review», n. 9, 1993, p. 7-12.



Example 4. The symbols used in Hornbostel's "synoptic scale", analysing a Hutu women's song¹¹

One should note that this criterion was intended for melodic structures, not aimed at scalar categorisation. Used in this sense, it seems to comply with a theoretical perspective in which a modal type of classifying order is balanced with the formulaic nature of melodic functionality. Is it a model of categorisation that remains on an intermediate level, between scale and mode? We will come back to this idea at the end of the article.

In any case, what Arom presents to us is a universe with no poles of attraction, a transparent space with no gravitational forces, in which one can certainly examine melodic ranges (the *aspect*, the lowest note used in a given melody and the layout of the other notes in ascending order), but which seems to tell us little or nothing about the sonic perspective or the specific syntactic quality with which to hear (in Wittgenstein's sense of "hearing as")¹² the melody. This method has been assimilated by Anglophone musicology, coming to identify the collection of pitches known as a *gamut*.

It is worth noting that, cognitively speaking, this methodology not only introduces an epistemological conditioning derived from score analysis instead of real music, as is the case with all transcriptions; it is furthermore, intrinsically and conceptually, dependent on the visual-abstractive *stress* (in the mediological sense of the term)¹³ imposed by the cognitive mediation of notation. No musically non-literate cultural insider could decode the melody in such a way, nor become aware of the "type" of information that can be gleaned from it. Indeed, cultural comprehension is directed by the directionality of sonorous-energetic tension and relaxation, which reach their *maximum* when a static pole of a kind of tonic arrival is identified, as part of the group of sounds which make up the melodic/scalar aggregate.¹⁴

But in Arom/Brăiloiu's classification of the pentatonic system, this identification disappears. A verification of this, i.e. of the fact that this method of classification is actually a-modal, can be obtained by a simple *argumentum a contrario*. If we were to choose the first note (*d*) as a tonic of the 4th type indicated by Arom (as, incidentally, it would probably be misunderstood by a contemporary student of a conservatory jazz course), we would immediately see that this option leads to an entirely different result. In this case, we would have a pentatonic scale with a fourth instead of a third.

With "Promenade" we would obtain, indeed, a pentatonic scale with F as its modal centre (mode: *f, g, b flat, c, d*),¹⁵ and yet it is perfectly clear that the pentatonic scale used by Mussorgsky corresponds (once again, from a modal point of view, not a "configurational" one) to the intervals of the 1st form, with *b flat* as its modal centre, instead of this 4th form, as can be inferred from the harmonisation provided by Rimsky-Korsakov (illustrated in the harmonic example below: cf. Ex. 5). Mussorgsky, by directing our perceptive decoding with the two flats in the key signature, unequivocally indicates *b flat* as the pentatonic modal centre.

¹¹ ERICH M. VON HORNBOSTEL, *Gesänge aus Ruanda*, in *Forschungen im Nil-Kongo-Zwischengebiet*, Hrsg. Jan Czekanowski, Vol. I, *Ethnographie*, Leipzig, Klinkhardt und Biermann, 1917, p. 409.

¹² For a critical discussion, cf. ALESSANDRO ARBO, *Entendre Comme. Wittgenstein et l'esthétique musicale*, Paris, Hermann, 2013.

¹³ VINCENZO CAPORALETTI, *I processi improvvisativi nella musica. Un approccio globale*, Lucca, LIM, 2005.

¹⁴ Whether these modulations of energy are to be considered as psycho-cognitive universals or cultural acquisitions is a debate that remains open. Cf. *infra*.

¹⁵ This, to digress, would coincide with the erroneous key signature seen in Example 2 (which with its three flats, modally speaking, indicates a F Dorian).

VI V6 VI V III V I VI V/V (6) V

Example 5. Analysis of the harmonisation of the pentatonic scale in “Promenade” from *Pictures at an exhibition*

Arom does not therefore seem willing to accept a modally oriented categorisation of pentatonism, in spite of the large amount of transcultural experimental psychology that testifies to the opposite. In fact, Arom’s certainty is barely dented by, but immediately recovers from, the most recent results in the psychology of perception.

*Now, when there is a tonic, it is defined by the leading tone, which provides the path through which to reach it. In an anhemitonic configuration, one cannot affirm the existence of a tonic properly speaking. But there is still, to take up Célestin Deliège’s expression, a certain “polarisation” towards one pitch, a hinge-note, often – but not always – the finalis, towards which various paths can lead.*¹⁶

Furthermore, based on my experience as a jazz musician and teacher, I must say that not even the premise of Arom’s reasoning can be generalised (and all the less so can its consequence). Indeed, generally speaking, a leading tone, understood as the seventh degree of the scale, a semitone below the octave, is not necessary to establish a tonic, understood as a hierarchical and perspective pole based on which the degrees of the others notes are defined. This note can also be found a tone or a tone and a semitone from the tonic, as is demonstrated by all so-called modal jazz.¹⁷ Any beginner guitarist who has learned the pentatonic “box” (a fingering pattern) in the 5th position of the guitar fretboard, when playing in blues or rock style, “knows” that the centre of this pentatonic scale is on the fifth fret of the first string, or the seventh fret of the fourth string or the fifth fret of the sixth string (all of which are the note *a*). If instead they intend to play in bluegrass style, the modal centre of the same fingering pattern will move to the eighth fret of the first string (or the fifth of the third, or the eighth of the sixth). And this new pentatonic scale, constructed on the same box – even if our guitarist does not know this in theory, while being aware of the phenomenon in practice – has *c* as its modal centre. Now, one cannot say that blues and bluegrass are influenced by the tonal system.

In any case, Arom’s scepticism towards the presence of a tonic in the five permutations represented by the pentatonic «types» (as we have seen, he underlines the need for them not to be called “modes”) – that is to say, his reluctance to define a tonic for them, as in major/minor tonal bimodality or for heptatonic modes – is not an idiosyncrasy of his. It comes from the past, being the legacy of a theoretical tradition that counts among its most luminous representatives the

¹⁶ AROM, *La ‘sindrome’*, cit., p. 164. I take this opportunity to thank Prof. Simha Arom, who in a personal communication (email 08/24/2019, 13:08) related to this article, agreed on the remarks about the example taken from Mussorgskij. As for the underlying question of the tonal center in the pentatonic scales, he shows to distance himself from the position of Brailoiu, that is, from the « convergence that you make there between Brailoiu and myself. The latter deals with pentatonic in general, although the examples he gives are mostly – if not entirely, I don’t remember very well – from traditional European music. As for me, I limit myself to the pentatonism of sub-Saharan Africa, as indicated in the title of the article “La sindrome’ del pentatonismo africano” (which you quote extensively). [...] In these musics, to speak of ‘tonic’ would be inappropriate, and it seems to me more relevant (and especially more prudent) to speak of ‘polarisation’, following Célestin Deliège – which I also mention in “Le Syndrome” [...] ».

¹⁷ GEORGE RUSSELL, *The Lydian Chromatic Concept of Tonal Organization for Improvisation*, New York, Concept Publishing Company, 1959.

Rumanian ethnomusicologist Constantin Brăiloiu (1893-1958), to whom for that matter Arom explicitly refers, quoting him repeatedly in the article. Therefore, let us turn our attention to the theoretical source, which precedes the article written by the authoritative French scholar by sixty years, to see what Brăiloiu maintained, and for which reasons.

1953, Constantin Brăiloiu

As the theoretical reference point for his entire discourse on the pentatonic system, Arom expressly quotes “*Sur une melodie russe*”,¹⁸ an essay dating to 1953 written by the great scholar of folk music, Constantin Brăiloiu (1893-1958), theorising the pentatonic scale in ethnomusicologically interesting cultures (with an abundance of examples taken from traditional European music). It is well worth quoting the entire passage in which he sets out his main reasoning, an all-out attack against those who introduce a tonic when categorising the pentatonic system. This latter approach, as Brăiloiu recognises, is strongly defended by a legion of authoritative scholars, including Gevaert and Sharp, Stumpf and Hornbostel, Abraham and Helmholtz.

The ambiguous and varying way in which the elements of the scale are referred to by one theoretician or another is generally caused by an obsession with classical tonality and a clear desire to make pentatonism conform with it, at any cost. The need for a tonic and sequences similar to those found in heptatonic scales, which revolve around one basic note, seems beyond doubt even to the most objective researchers and continues to confuse many minds. Gevaert’s erudition and his exceptionally open mind do not prevent him from writing that “we cannot enjoy a sequence of sounds, we cannot even confidently sing or play them in tune, without mentally tying it to a fixed point of departure, a tonic”, a principle that emerges more or less energetically, from time to time and from place to place, but without which “neither music nor true song can exist, but only an indefinite singsong, with no rules nor constraints”: this is proved by “those rudimental dialects found in Africa and Australia that, only a few miles away or a few years later, become completely unrecognisable”.¹⁹ And yet many scholars have realised that “defining the tonic, in this case”, as Helmholtz writes, “is much more uncertain than with a seven-note scale”;²⁰ Stumpf too is struck, at least once, by this difficulty; he does not however give up on his search for the “main tone”.²¹ Sharp recognises in turn that defining “the position of the tonic” (which, in any case, he believes to be “decisive”)²² may at times depend on a subjective opinion, and he is unsure whether a certain English song belongs to one mode (“if D be the tonic”) or another (“if C be the tonic”).²³ Lastly, Abraham and von Hornbostel, while maintaining that “to compare the laws according to which scales are formed, it is indispensable to choose a basic note (Grundton)”, are forced to recognise that this basic note “does not necessarily coincide with the tonic (the melodic centre of gravity) nor with the initial or final note”.²⁴ With what right, one may well ask, does it then deserve the name of Grundton?²⁵

Having reached this point, Brăiloiu launches his conclusive reasoning, based on a musical example that, according to him, definitively resolves the question, confuting once and for all the theses defended by those who introduce a tonic. To succeed in such an ambitious refutation, his target had to be equally authoritative, and for this reason Brăiloiu presents a giant figure in

¹⁸ CONSTANTIN BRĂILOIU, *Sur une melodie russe*, in *Musique russe*, a c. di Pierre Souvtchinsky, vol. 2, P.U.F., Paris, 1953, p. 329-391 (Italian translation *Su una melodia russa*, in ID., *Folklore Musicale*, Vol. II, Roma, Bulzoni, 1982).

¹⁹ FRANÇOIS-AUGUSTE GEVAERT, *Histoire et théorie de la musique de l’antiquité*, Gand, Annot-Braeckman, 1875, p. 161.

²⁰ HERMANN LUDWIG FERDINAND VON HELMHOLTZ, *Théorie physiologique de la musique fondée sur l’étude des sensations auditives*, Paris, Masson, 1874, p. 581. (Brăiloiu refers to the French edition of Helmholtz’s treatise).

²¹ CARL STUMPF, *Die Anfänge der Musik*, Leipzig, Verlag von Johann Ambrosius Barth, 1911, p. 149.

²² CECIL JAMES SHARP, *English Folk Songs from the Southern Appalachians*, London, Oxford University Press, 1932, p. XIX.

²³ *Ivi*, p. 57-64: nos. 8-9A.

²⁴ OTTO ABRAHAM e ERICH MORITZ VON HORNBOSTEL, *Studien über das Tonsystem der Japaner*, «Sammelbände für Vergleichende Musikwissenschaften», n. 1, 1922, p. 186.

²⁵ BRĂILOIU, *Su una melodia russa*, cit., p. 13-14.

positivistic science: the German scientist-philosopher, psychologist, physicist and physiologist Hermann Helmholtz.

The further one enquires into the implications ensuing from this entirely artificial doctrine, the more serious the errors they contain become. Thus – limiting ourselves to only one example – we see Helmholtz speaking of a “scale without third and sixth, probably an old bagpipe tune”, while discussing a Scottish melody²⁶ (Ex. 6) constructed on a pentatonic scale that is not only complete, but in which the supposedly absent third occurs abundantly, no less than twice. This is because the song ends on 2 (here, a) and according to Helmholtz, who had established that this a is a tonic, it can only be an incomplete a minor. [Author’s emphasis]²⁷



Example 6. The «Scottish melody» mentioned by Helmholtz, notated by Brăiloiu. To the right, the elements of the pentatonic scale extrapolated by Brăiloiu

Now – leaving aside the fact that the «supposedly absent third» occurs not two, but no less than four times – we shall see that Brăiloiu’s reasoning has a few more surprises in store for us. And so, to verify its substance we must go further back in time, to the source of this key example, with which Brăiloiu seems to definitively seal a paradigmatic position – ruling out the modal nature of pentatonic scales – destined to remain even in the most recent results of contemporary ethnomusicology, as we saw with Arom. The source of this piece of evidence, as indicated by Brăiloiu himself in 1953, is Helmholtz, in a seminal text written ninety years earlier.

1863, Hermann Helmholtz

A volume fundamental for the future of musicology was published in 1863: the treatise on acoustics, psychology and music aesthetics entitled *Die Lehre von den Tonempfindungen: als Physiologische Grundlage für die Theorie der Musik* by Hermann Helmholtz (1821-1874).

In chapter 14 of the 3rd Part of the treatise, Helmholtz illustrates how musical scales are formed, including those made up of five notes, which he states are common among the Chinese and «the Celts of Scotland and Ireland». As regards the genetic formation of pentatonic scales, Helmholtz follows a line of reasoning that differs from the usual criterion of a sequence of fifths (producing the series of notes $c_1-g_1-d_2-a_2-e_3$, which are then brought back to the same octave, in an explanatory model that, in actual fact, Brăiloiu too follows, even while criticising it as artificial, abstract and doctrinal).²⁸ In Brăiloiu’s systematic organisation, instead, as we have seen, a fundamental role goes to the position of the *pyknon*, the interval of a major third. This

²⁶ HELMHOLTZ, *Théorie physiologique*, cit., p. 342.

²⁷ BRĂILOIU, *Su una melodia russa*, cit., p. 14.

²⁸ As regards the progression of fifths, Brăiloiu states that: «[...] it is obvious to anyone with the slightest experience of popular song and the psychic behaviour of an illiterate person that the coordinated operation presumed by this theory [author’s note: a progression of consecutive fifths] is a pure game of the mind.», *ibid.*, p. 15. In any case, Brăiloiu accepts the version elaborated in ancient Chinese theory, in which the progression is made up of a series of ascending fifths and descending fourths, so that the notes of the pentatonic scale lie within a fifth.

methodological choice leads him to classify the sequence *g-a-b-d-e* as the prototypical first form,²⁹ with the major-third pyknon in the initial position. Most likely, Brăiloiu does not realise that this introduces an involuntarily ethnocentric conditioning, that links this pentatonic formation to a major tonality.

Helmholtz follows an entirely different path, oriented in his methodological choice by the idea that the mode is provided with a tonic.³⁰ To demonstrate this, he accompanies each pentatonic modal form with a traditional piece representing it. In the case of the 3rd pentatonic scale in Helmholtz's classification, *c-d-f-g-b* flat («Third scale. Without Third and Sixth»), we finally encounter the example mentioned by Brăiloiu (Ex. 7).³¹ This is a traditional «Gaelic» melody, based on Helmholtz's 3rd pentatonic mode transposed up a major third (*e-f#-a-b-d*), to which he assigns *e* as a tonic: it is the verse of what is «probably an old bagpipe tune», as the caption reads, preceded by a four-bar refrain, not transcribed by Brăiloiu. The text indicates the character of a lively festive song.

Example 7. The «Gaelic» melody reproduced by H. Helmholtz, *On the Sensations of Tone*, cit. p. 261

We saw that Brăiloiu, owing to a methodological rigour intended to avoid using a key signature and achieve a more concise notation, transposes the song's verse by an ascending fourth. And yet, we immediately notice something anomalous here as well, which may well have influenced his interpretation: the transposition contains some interesting inaccuracies.³²

²⁹ Brăiloiu uses *g* as the initial note, instead of *c*, for reasons involving simple notational efficiency: no key signature is required and the range fits on the staff, neither too low nor too high. Cfr. *ivi*, p. 12.

³⁰ Helmholtz's original guiding criterion («a longer path», as Brăiloiu defines it, *ivi*, p. 16) is once again the series of fifths, but developed according to the intervals closest or most similar to the tonic, which leads him to prefer perfect fifths and fourths (not only ascending, but also descending along the circle of fifths). What emerges is a series of natural harmonics beginning from *c* that forms a sequence of intervals close to the tonic, which are, beyond the octave, the first intervals in the series of harmonics, 2:3, 3:4, 3:5): a fifth (from *c* will be *g*), a fourth (*f*) and a major sixth (*a*). Excluding the major third *e*, which would form a semitone with the fourth degree, Helmholtz adds the fifth of the fifth (*d*). The intervallic sequence of the basic pentatonic scale, unlike the one defined by Brăiloiu, is therefore: *c-d-f-g-a* (which has no ethnocentric connotations due to a similarity with a major tonality, given that the pyknon – the major third – does not appear in the initial position). Applying the same intervals in descending order, one obtains, beginning from *c*: *c-b* flat-*g-f-e* flat, which put into a different order make up the second pentatonic scale: *c-e* flat-*f-g-b* flat, and so on for the other three scalar aggregates. Cf. HERMANN HELMHOLTZ, *On the Sensations of Tone as a Physiological Basis for the Theory of Music*, English translation by Alexander Ellis, London & New York, Longmans Green, III ed., 1895, p. 258-259.

³¹ *Ibid.*, p. 261.

³² These inaccuracies have been maintained in the Italian translation, cit.

To settle the vexed question, in line with anthropological protocol, one would have to find an insider able to provide us with the required information: we are thus led to carry out an exercise in paleo-ethnomusicology, searching for the evidence given by a historical Scottish cultural informer. To see if this is possible, let us take yet another leap back in time, this time three quarters of a century.

1786, James Johnson

In the winter of 1786, James Johnson (ca. 1753-1811),³⁷ a music printer from Edinburgh, met the poet Robert Burns. The two shared a passion for old Scottish airs, and their partnership led to an editorial project entitled *Scots Musical Museum*, comprising six volumes published between 1787 and 1803, the first³⁸ of which was the most wide-ranging and organic collection of traditional Scottish songs ever to appear. Burns contributed to this work by rewriting the texts of many songs and adding others composed by himself (a philological approach to folk music still belonging to the future); it includes roughly six hundred pieces and was reprinted various times. This is the collection that Haydn, Beethoven and many others drew on for re-elaborations and arrangements.

The musical artefacts in question were saved from oblivion thanks to the two collectors' expertise and passion, animated as they were by the same desire to rediscover and safeguard age-old popular traditions that, as of the late 18th century, with Romantic nationalism, was to animate similar experiences in other European nations. In any case, Johnson was more or less a contemporary of Johann Gottfried Herder (1744-1803), who can be considered the main source of inspiration for this entire movement.

I believe that there could be no better place to look for Helmholtz's «Gaelic» piece. And surely enough, my research was fruitful. Even though it has a different text, the musical part of piece 180 of the 2nd Volume (1788), pp. 187-188, under the title *Blythe was she*³⁹ (Example 9), exactly corresponds to the example reproduced by Helmholtz (who clearly came across it in another source, bearing witness to how well-known the piece was). In any case, the notes are identical (except for the repeated semiquaver *b*₃, a syllabic adjustment in the repetition of the *chorus*), as is the key signature, bearing only one sharp. Their formal structures, subdivided into chorus and verse, also correspond.

The songs collected by Johnson and Burns were notated on two staves and intended for a keyboard instrument. This meant that the melody was generally written on the upper staff, and that the lower one included a figured bass. This procedure leaves some room for doubt from a philological point of view, since it provides a harmonic treatment for older modal melodies, but in our case and to the purposes of our discussion it turns out to be extremely informative, even decisive.

³⁷ JAMES CUTHBERT HADDEN, *Johnson, James (d. 1811)* in *Dictionary of National Biography*, ed. Sidney Lee, vol. 30. London, Smith, Elder & Co., 1892.

³⁸ As early as 1724, Allan Ramsay published *Tea-Table Miscellany*, a medley of Scottish airs intended for recreational purposes.

³⁹ In the volume's table of contents, the piece is indicated with a different title: *Blythe, blythe and merry was she*.

Blythe was she.

180 * Blythe, Blythe and merry was she, Blythe was she but & ben:

Blythe by the banks of Ern, And blythe in Glen-turit glen. By

Oughtertyre grows the aik, On Yarrow banks, the bjrken shaw; But

Phemie was a bonier lasse Than braes o' Yarrow e-ver faw.

Chorus

Blythe, Blythe and merry was she, Blythe was she but and ben.

Blythe by the banks of Ern, And blythe in Glen-turit Glen.

Example 9. *Blythe was she*, from J. Johnson, *Scots Musical Museum*, 1788.

Having set out to settle the dispute between Brăiloiu and Helmholtz, what we were looking for was a way to define the perception, by possible cultural insiders, of the melody that Brăiloiu used to argue against the presence of a tonic, which Helmholtz indicated as *e* (corresponding to an *a* in Brăiloiu's transcription). Now, I believe that two people such as Johnson and Burns, both born in Scotland in the mid-18th century, can fully be considered insiders, as regards old Scottish songs. Precisely the bass notation proposed by them is unquestionably indicative of a modal prospective, and is thus crucial as regards the attraction or polarisation provided by a possible tonic.⁴⁰

What does the transcription of the song essentially tell us?

It tells us that Helmholtz was right, in every sense. The piece has a clear modal centre, *e*. Upon a closer glance, unlike other examples, this song is not harmonised with a figured bass, perhaps in recognition of its archaic character, but its lower staff contains an intermittent drone on *e*, alternating with *d*, which clearly indicates its modal identity. Indeed, as maintained by Helmholtz, *e* is the modal tonic of this piece, which therefore does not present the «character of a major mode», but recalls the “minor” sonority of a E Dorian.

We can now fully affirm that the cornerstone on which Brăiloiu constructed his counterargument provides no foundation whatsoever. Does this fact also authorise us to believe that the theoretical infrastructure underpinning his reasoning must also be discarded?

⁴⁰ Above and beyond their ethnographic admissibility, one must distinguish these harmonisations, made by insiders themselves and therefore bearing witness to an emic perception of the piece, from the ones made by late-19th century folk music researchers, such as Alice Cunningham Flechter and John Comfort Fillmore (cf. *infra*). The latter, following the theory of “implied harmony”, maintained that Western harmony was universal, the perfect result teleologically implied by the “primitive” expressions of the human spirit, as they defined songs from the North American Omaha and Navaho nations.

Today

After this excursion into the past, we may now return to the present day with a few certainties that may not be ironclad but are at least deeply rooted. Our conviction is that, essentially, the theoretical question of pentatonic scales, as elaborated in musicology, in Europe in particular, has much to do with the linguistic opposition between phonetics and phonology (or, if you will, the anthropological opposition etic/emic).

The layout of Brăiloiu/Arom's five pentatonic *configurations* concretely defines the sequence of the various notes in the five *types*, by describing it. This is in contrast with a survey of the abstract, systemic relations through which the notes interact in the mode. A criterion used for describing *melody*, therefore, is already used here for *scalar* sets of notes. Does this perhaps authorise us to believe, theoretically speaking, that what is at stake is a conception of modality as a coalescence of melodic and scalar typologies? In Brăiloiu/Arom's conception, what seems to emerge is a notion of pentatonic *types* that lies in an intermediate position between the notions of scale and mode. And surely enough, one musicologist in particular has actually filled this empty theoretical box: the missing piece is provided by Jacques Chailley, who introduced the notion of *system*.

*Within the scale, a SYSTEM is cut out that includes the notes that are actually used. We have no notion of a tonic nor a final note in the system, but a tentative outline of a structure may start to come to light through the more or less complete structuring of structural intervals [...]*⁴¹

Chailley's notion of *system*, in its intermediate place between scale and mode, can be compared to a *gamut*, according to Nattiez.⁴² Indeed, in Brăiloiu/Arom's taxonomy we find the "ascending order" of the notes that are actually used. This model, as pointed out above, is linked to the etic perspective, belonging to cultural outsiders, according to whom a descriptive approach provides more guarantees than an emic viewpoint, which implies a deep cultural and systemic knowledge that in turn allows the same to be discerned within the different, controlling the field of dispersion of the distinctive trait. But, obviously, this is not the only factor at stake.

Let us analyse, in particular, Brăiloiu's position. To understand his peculiar insistence on the «uncertainty of the tonic»⁴³ in pentatonic scales, a rigidly defended theoretical stance that led him – as we have seen – to risk making serious blunders, we must recall that this discussion raises more general epistemological problems. These latter issues are highly significant in anthropological research and folk music studies, and were highly topical, in particular, during the years in which Brăiloiu was active.

He was led not to recognise any kind of tonic in pentaphony for both intrinsic reasons, inherent to the epistemological model to which he subscribed, and extrinsic ones, regarding other schools of thought. Among the former, the most conspicuous is his (pre)structuralist systematic thought. Brăiloiu is known to be considered by Gilbert Rouget as the «Troubetzkoy of musicology»:⁴⁴ according to his vision, the pentatonic system is synchronic, and his epistemological approach seeks to avoid depending on any historical-diachronic, or genetic, factors. The system is self-sustaining and, as such, one can rule out it being a primitive precursor of heptaphony or of the

⁴¹ JACQUES CHAILLEY, *Éléments de philologie musicale*, Paris, Leduc, 1985, p. 58 (cit. in NATHALIE FERNANDO, *Scale e modi. Verso una tipologia dei sistemi scalari*, in *Enciclopedia della musica*, a c. di Jean-Jacques Nattiez et al., Vol. V, Torino, Einaudi, 2005, p. 930).

⁴² «It is not unlikely that Chailley rediscovered the American concept of gamut when defining the system: "Within the scale, a system emerges that includes the notes that are actually used"». JEAN-JACQUES NATTIEZ, *Il discorso musicale*, Turin, Einaudi, 1987, p. 35.

⁴³ In addition to the discussion quoted above, Brăiloiu gives this name to a specific section of his essay. BRĂILOIU, *Su una melodia russa*, cit., p. 24.

⁴⁴ GILBERT ROUGET, Preface, in Constantin Brăiloiu, *Problèmes d'ethnomusicologie*, Geneva, Minkoff, 1973, p. XIII. Brăiloiu's pre-structuralist mindset is also noted, in the Italian edition of Brăiloiu's writings, by GIORGIO RAIMONDO CARDONA, *Presentazione*, in BRĂILOIU, *Folklore Musicale*, Vol. II, cit., p. 1.

tonal system, evolutionarily perfectible. Defending at any cost the pentatonic system's systemic transparency and cultural autonomy was the historical mandate that Brăiloiu felt he had to defend.

From an extrinsic point of view, his position opposed the fundamental axioms of comparative musicology: ethnocentrism, which he saw as introducing distortions when harmonising ethnic melodies,⁴⁵ and teleology, according to which pentaphony is no more and no less than a primitive stage of heptaphony. This is implied by the theory of the *Kulturkreis*, that Brăiloiu considered to be another worn-out comparative theoretical tool:⁴⁶ from this diffusionist point of view, indeed, pentatonic scales would be seen as a residual and archaic remnant of medieval ecclesiastic modes. Ultimately, admitting the modal nature of pentatonic scales would for Brăiloiu be equivalent to confirming the evolutionistic criteria of *vergleichende Musikwissenschaft*.

This entire discussion clearly has overtones in cultural politics, which are inherent in the epistemological orientation of research on folk music and a few years later ethnomusicology, within demo-ethno-anthropological disciplines as a whole. Indeed, a Eurocentric legitimation of pentatonic culture, by relating it to the noble lineage of church music, was indeed a position that in the folklorist Brăiloiu's eyes, precisely because it invalidated the intrinsic worth of this cultural phenomenon, would have epistemologically compromised the disciplinary status itself of an entire area of research.

Brăiloiu, in carrying out his battle, committed some rather significant mistakes (above and beyond his oversights in transcription, which may yet be considered as decisive, since they falsify a "data field" – which, incidentally, is rather poor –⁴⁷ from which to construct interpretations). First and foremost, he denies the possibility of a pentamodal conception on the basis of dryly notated examples, as in the case of the "Scottish melody", re-transcribed in terms of a pentatonic scale with its *pyknon* in the initial position, on *g*, modelled on the major diatonic scale, thus running up against the very same ethnocentric conditioning that for ideological reasons he would have preferred to avoid and condemn. Furthermore, his perception as a cultural outsider, with respect to the melodic evidence, not only leads him to commit a limited blunder, but methodologically restricts him within an *etic* analysis intended to suspend judgement and limit itself to describing what exists, through a non-hierarchical conception of the pentatonic scale. Without mentioning, lastly, that the choice of category itself (its scalar setting) retroactively introduces an oriented perception of the melody.

A different situation, compared to the line going from Brăiloiu to Arom, appears in the tradition of Anglophone studies, where Brăiloiu's influence was less pronounced.⁴⁸ This line of research, which originated in the area of evolutionistic theory, is more pragmatic as regards the modal nature of pentatonism. As of 1911, Annie Gilchrist⁴⁹ proposed a genetic vision of the heptatonic modes, inaugurating a line that was followed by Sharp⁵⁰ (as we have seen) and that proceeded through the Sixties with Bertrand Bronson.⁵¹ The latter, with his model of the "modal star", effectively illustrated the passage from pentaphony to hexaphony and ultimately heptaphony,

⁴⁵ For an extreme example of this practice, cf. JOHN COMFORT FILLMORE, *The Structure of Indian Music*, «American Anthropologist», New Series, vol. 1, n. 2 (Apr., 1899), p. 297-318, in which the author, with anthropological and not artistic intentions, transcribes pentatonic melodies from the native North American Omaha nation for the piano, harmonising them in late-Romantic style.

⁴⁶ With a few exceptions, according to NATTIEZ, *Il combattimento*, cit., p. 79.

⁴⁷ For a methodological discussion of the issue of «rich/poor data field» in musicological research, cf. ERIC CLARKE and NICHOLAS COOK, *Empirical Musicology: Aims, Methods, Prospects*, Oxford-New York, Oxford University Press, 2004, p. 4 and ff.

⁴⁸ The first English translation of a text by Brăiloiu dates to 1984 (CONSTANTIN BRĂILOIU, *Problems of Ethnomusicology*, Cambridge, Cambridge University Press, 1984).

⁴⁹ ANNIE G. GILCHRIST, *Notes on the Modal System of Gaelic Tunes*, «English Folk Dance and Song Society Journal», vol. 4, 1911, p. 150-153.

⁵⁰ CECIL J. SHARP and OLIVE CAMPBELL, *English Folk Songs from the Southern Appalachians*, London, Putnam, 1917.

⁵¹ BERTRAND HARRIS BRONSON, *The Ballad as Song*, Berkeley, University of California Press, 1969.

raising criticism from Cazden,⁵² but later being followed up on in Italy, with the integrative commentary published by Tullia Magrini⁵³ in the 1980s.

Taking a look outside of Western ethnomusicology, it is odd that native music theories found in cultures, especially oriental ones, in which the pentatonic system has been studied and theorised for centuries, have not been part of this entirely European and American discussion. I am referring in particular to Chinese culture: well, this cultural tradition has always considered pentatonic scales as *modes*, complete with a modal tonic and a classification of songs and instrumental pieces by way of the five types.⁵⁴

If we ask ourselves what is the dominant opinion as regards this complex and long-standing *querelle* today, we cannot ignore the contribution made by the neurosciences and the psychology of perception and categorisation. As stated by Celestin Deliège while quoting Arom (see above), even in the case of anhemitonic pentatonic scales, perception and categorisation cannot operate without a “polarisation” that orients them. One important study by Carterette and Kendall,⁵⁵ currently considered a reference point in comparative psychology, has taken a clear stance on the matter. The two American scholars examine Arom and Fürniss⁵⁶ experimental research dating to 1993, which is at the root of the French ethnomusicologist’s convictions as to the a-modality of pentatonic scales, at least regarding the Aka Pigmies from Central Africa.

The authors confirmed their hypothesis that order of succession of the degrees in a pentatonic scale prevails over interval widths. These outcomes led them to question the idea that a scale system is a mental grid with position of each scale degree.⁵⁷

They counter this position, however, with a «contrasting» study carried out the same year by Dehoux and Voisin⁵⁸ on Central African xylophone music, in which the two scholars identified specific tonal concepts in the perception of these scales. «[They] found scale concepts that varied by ethnic group, particularly with respect to the interaction of pitch and timbre». ⁵⁹ The conclusion reached by the two American scholars, who also mention Arom’s interactive use of the Yamaha DX7 synthesiser, is surprisingly trenchant: «These researchers are enamoured of “interactive experimental method” but have little conception of experimental design and control». ⁶⁰

As regards epistemological reflexion, a renewed interest in the search for universals has recently appeared, in particular those referred to as “strategic” or bio-psychologically founded (which, like the implicative inferences theorised by Leonard Meyer, bring cognitive processes into play).⁶¹ Molino and Nattiez identify the presence of a tonic as the factor inevitably required to identify a musical syntax, «universally» and thus in the case of pentaphony as well. «It seems that

⁵² NORMAN CAZDEN, *A Simplified Mode Classification for Traditional Anglo-American Song Tunes*, «Yearbook of the International Folk Music Council», 1971, p. 44-77.

⁵³ TULLIA MAGRINI, *Modalità e mobilità melodica nella musica popolare*, in *Musica e liturgia nella cultura mediterranea*, ed. by Piero G. Arcangeli, Florence, Olschki, 1988, p. 149.

⁵⁴ See LI, CHONGGUANG (李重光), *音乐理论基础 (Fundamental Music Theory)*, 北京, 人民音乐出版社. 1962, and, furthermore, CAI, YI, “论中国民族音乐文化的传承” (*On the cultural heritage of traditional Chinese music*), «艺术教育», «Artistic Education», n. 7, 2008, p. 62-64.

⁵⁵ EDWARD C. CARTERETTE and ROGER A. KENDALL, *Comparative Music Perception and Cognition*, in *Psychology of Music*, ed. by Diana Deutsch, II Ed., London, Academic Press, 1999, p. 725-792.

⁵⁶ AROM and FÜRNISS, *An interactive experimental method*, cit.

⁵⁷ CARTERETTE and KENDALL, *Comparative Music Perception*, cit., p. 735.

⁵⁸ VINCENT DEHOUX and FRÉDÉRIC VOISIN, *An interactive experimental method for the determination of musical scales in oral cultures*, «Contemporary Music Review», 9, p. 13-19.

⁵⁹ CARTERETTE and KENDALL, *Comparative Music Perception*, cit., p. 735.

⁶⁰ *Ivi*, p. 736.

⁶¹ JEAN MOLINO and JEAN-JACQUES NATTIEZ, *Tipologie e universali*, in *Enciclopedia della musica*, ed. by Nattiez, vol. V, cit., p. 341; ID., *Frammentazione o unità della musica?*, *ivi*, p. xxxiv and ff.

the possibility of organising a syntax rests, universally, on the ability of a discrete element to create a relation between an expectation and a feeling of closure». ⁶²

As a corollary of this position, many voices have expressed, especially among those who are supposed to be protected, a sort of impatience with an excessive “anthropological zeal” in constructing cultural otherness. The attitude criticised here is extremely careful to avoid any suspicion of ethnocentrism, but winds up concealing objectively shared factors. This ideological conditioning has been repeatedly stigmatised by Kofi Agawu, in particular in the theoretical representation of African rhythms, where an obstinate tendency is shown by (not only) Western researchers to identify this system with a principle opposed to the divisive one used in the West.

So, although Jones, Nketia, Brandel, and many others once insisted that additive rhythm is, as Nketia put it, “the hallmark of African music,” this viewpoint is in all likelihood a colossal error. It would seem, then, that whereas structural analysis (based in European metalanguage) endorses an additive conception of the standard pattern, cultural analysis (originating in African musicians’ thinking) denies it. ⁶³

And what about the teleology so strongly opposed by Brăiloiu? Various elements points towards a renewed interest towards comparative musicology ⁶⁴ and evolutionistic theories, naturally revised and corrected in the light of a century of academic debate and the development of the neurosciences. On this matter, and to come back to pentatonism, I would like to propose one final suggestion.

1613 (and the 14th century), Robert ap Huw Manuscript

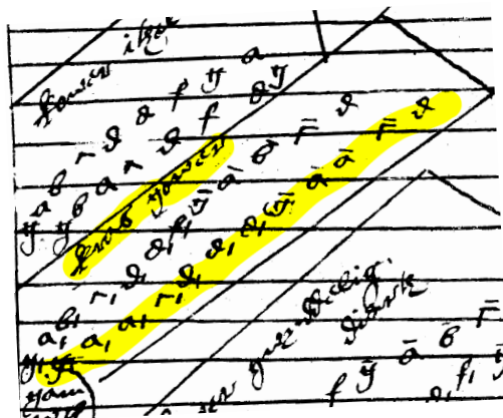
The oldest European collection of harp music is referred to as the *Robert ap Huw Manuscript* (B. M. Addl. MS 14905), ⁶⁵ compiled in 1613 by the Gaelic harpist Robert ap Huw (ca. 1580-1665). It includes 31 pieces in tablature and other exercises, dating to the period between the 14th and 16th centuries. On p. 108 of the manuscript, there is a diagram in which Robert ap Huw notates a few *scordature* (alternative tunings for the harp). Well, observing Example 10 one will note that the harpist describes a *scordatura* – called *kras gower* – that derives a pentatonic scale (*g-a-c-d-e*) (which I have highlighted in the example) from a Mixolydian mode on *g* (*g-a-b-c-d-e-f*); the transformation comes about by lowering the tuning of the *b* and *f* strings, in the Mixolydian scale on *g*, respectively to *a* and *e* (obviously, the harp will now have two strings tuned to *a* and two to *e*, found alongside one another).

⁶² MOLINO and NATTIEZ, “Tipologie e universali”, *Enciclopedia della musica*, vol. V, cit., p. 352

⁶³ KOFI AGAWU, *Structural Analysis or Cultural Analysis? Competing Perspectives on the ‘Standard Pattern’ of West African Rhythm*, *Journal of the American Musicological Society*, vol. 59, n. 1, 2006, p. 11.

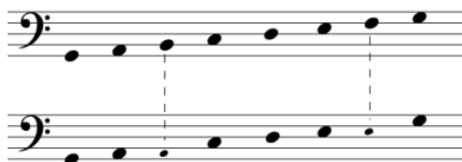
⁶⁴ Cf. the website *Comparative Musicology* <http://www.compmus.org/>

⁶⁵ Cf. SALLY HARPER, *The Robert ap Huw Manuscript and the Canon of Sixteenth-Century Welsh Harp Music*, in *Robert ap Huw Studies / Astudiaethau Robert ap Huw*, ed. by Sally Harper, *Welsh Music History / Hanes Cerddoriaeth Cymru*, vol. 3, Cardiff, University of Wales Press, 1999, p. 130-161; Id., *Music in Welsh Culture before 1650: A Study of the Principal Sources*, Aldershot, Ashgate, 2007.



Example 10. *Robert ap Huw Manuscript*, 1613, p. 108. The pentatonic scale derived from the Mixolydian mode is highlighted.

I have transcribed the example into modern notation to make the intermodal relation more clear.



Example 11. Transcription in modern notation of the pentatonic *scordatura*. Note the *b* and the *f* of the Mixolydian mode lowered respectively to *a* and *e*.

This example seems to attest to a close relation between pentatonism and medieval ecclesiastical modality, in which the one derives from the other, confirming the theses of Annie Gilchrist and Cecil Sharp, so strongly criticised by Brăiloiu. The truly interesting thing is that, in this ancient and pre-evolutionistic document, the pentatonic scale put in relation with the Mixolydian mode by Robert ap Huw corresponds exactly to the 1st pentatonic mode defined by Helmholtz in 1863. This mode has a second, fourth and a fifth in its initial position, and not Brăiloiu's (and Riemann's) major-third *pyknon*. I believe this is sufficient to reflect on paradigms that we had taken to be untouchable and others we thought had been overcome.

Vincenzo Caporaletti
vincenzo.caporaletti@unimc.it
 Università di Macerata
 (Translated by the Author and rev. by Brent Waterhouse)

Bibliography

- ABRAHAM, Otto & HORNBOSTEL, Erich Moritz von, “Studien über das Tonsystem der Japaner”, *Sammelbände für Vergleichende Musikwissenschaften*, no. 1, 1922, pp. 181-231.
- AGAWU, Kofi, “Structural Analysis or Cultural Analysis? Competing Perspectives on the ‘Standard Pattern’ of West African Rhythm”, *Journal of the American Musicological Society*, vol. 59, no. 1, 2006, pp. 1-46.
- ARBO, Alessandro, *Entendre Comme. Wittgenstein et l'esthétique musicale*, Paris, Hermann, 2013.
- AROM, Simha, “Le ‘syndrome’ du pentatonisme africain”, *Musicae Scientiae*, vol. I, no. 2, 1997, pp. 139-163.
 — “La ‘sindrome’ del pentatonismo africano”, in Maurizio Agamennone et Serena Facci (éd.), *Le ragioni della musica. Scritture di musicologia africanista*, Lucca, LIM, 2013, pp. 141-166.
- AROM, Simha & FÜRNISS, Susanne, “An interactive experimental method for the determination of musical scales in oral cultures. Application to the vocal music of the Aka Pygmies of Central Africa”, *Contemporary Music Review*, n. 9, 1993, pp. 7-12.
- BRĂILOIU, Constantin, “Sur une melodie russe”, in Pierre Souvtchinsky (éd.), *Musique russe*, vol. 2, P.U.F., Paris, 1953, pp. 329-391.
 — *Problèmes d'ethnomusicologie*, Genève, Minkoff, 1973.
 — “Su una melodia russa”, *Folklore Musicale*, Vol. II, Roma, Bulzoni, 1982, pp. 7-59.
 — *Problems of Ethnomusicology*, Cambridge, Cambridge University Press, 1984.
- BRONSON, Bertrand Harris, *The Ballad as Song*, Berkeley, University of California Press, 1969.
- CARTERETTE, Edward C. & KENDALL, Roger A., *Comparative Music Perception and Cognition*, in *Psychology of Music*, ed. Diana Deutsch, II Ed., London, Academic Press, 1999.
- CAI, YI, “论中国民族音乐文化的传承” (Sur l'héritité culturelle de la musique traditionnelle chinoise), *艺术教育, Educazione Artistica*, no. 7, 2008, pp. 62-64.
- CAZDEN, Norman, “A Simplified Mode Classification for Traditional Anglo-American Song Tunes”, *Yearbook of the International Folk Music Council*, 1971, pp. 44-77.
- CHAILLEY, Jacques, *Éléments de philologie musicale*, Paris, Leduc, 1985.
- CAPORALETTI, Vincenzo, *I processi improvvisativi nelle musica. Un approccio globale*, Lucca, LIM, 2005.
 — “La forma groovemica di Spinning Plates del Broken Arm Trio”, *Per Archi*, no. 5, 2010, pp. 129-146.
- CARDONA, Giorgio Raimondo, “Presentazione”, in BRĂILOIU, *Folklore Musicale*, Vol. II, Roma, Bulzoni, 1982, pp. 1-4.
- CLARKE, Eric & COOK, Nicholas, *Empirical Musicology: Aims, Methods, Prospects*, Oxford-New York, Oxford University Press, 2004.
- DEHOUX, Vincent & VOISIN, Frédéric, “An interactive experimental method for the determination of musical scales in oral cultures”, *Contemporary Music Review*, no. 9, pp. 13-19.
- FERNANDO, Nathalie, “Scale e modi. Verso una tipologia dei sistemi scalari”, in Jean-Jacques Nattiez et al. (éd.), *Enciclopedia della musica*, Vol. V, Torino, Einaudi, 2005, pp. 924-956.
- FILLMORE, John Comfort, “The Structure of Indian Music”, *American Anthropologist*, New Series, vol. 1, no. 2 (Avril 1899), pp. 297-318.
- GEVAERT, François-Auguste, *Histoire et théorie de la musique de l'antiquité*, Gand, Annoot-Braeckman, 1875.

- GIANNATTASIO, Francesco, “Le pentatonisme africain en tant qu’“univers du discours” », *Musica Scientiae*, Discussion Forum 1, 2000, pp. 73-81.
- GILCHRIST, Annie G., “Notes on the Modal System of Gaelic Tunes”, *English Folk Dance and Song Society Journal*, vol. 4, 1911, pp. 150-153.
- HARPER, Sally, “The Robert ap Huw Manuscript and the Canon of Sixteenth-Century Welsh Harp Music”, in *Robert ap Huw Studies / Astudiaethau Robert ap Huw*, ed. by Sally Harper, *Welsh Music History / Hanes Cerddoriaeth Cymru*, vol. 3, Cardiff, University of Wales Press, 1999, pp. 130-161.
 — *Music in Welsh Culture before 1650: A Study of the Principal Sources*, Aldershot, Ashgate, 2007.
- HELMHOLTZ, Hermann Ludwig Ferdinand von, *Théorie physiologique de la musique fondée sur l'étude des sensations auditives*, Paris, Masson, 1874.
 — *On the Sensations of Tone as a Physiological Basis for the Theory of Music*, trad. anglaise Alexander Ellis, London & New York, Longmans Green, III ed., 1895.
- HORNBOSTEL, Erich M. von, “Gesänge aus Ruanda”, in Jan Czekanowski (hrsg.), *Forschungen im Nil-Kongo-Zwischengebiet*, Vol. I, *Ethnographie*, Leipzig, Klinkhardt und Biermann, 1917, pp. 379-412.
- HUNTER, Richard Ian, “Johnson, James”, in H.G.C. Matthew et B. Harrison (eds.), *Oxford Dictionary of National Biography*, Oxford-New York, Oxford University Press, vol. 30, 2004, pp. 273-274.
- LI, CHONGGUANG (李重光), *音乐理论基础 (Teoria Musicale Fondamentale)*, 北京, 人民音乐出版社, 1962.
- MAGRINI, Tullia, “Modalità e mobilità melodica nella musica popolare”, in Piero G. Arcangeli (éd.), *Musica e liturgia nella cultura mediterranea*, Firenze, Olschki, 1988, pp. 143-156.
- MOLINO, Jean & NATTIEZ, Jean-Jacques, “Frammentazione o unità della musica?”, in Jean-Jacques Nattiez et al. (éd.), *Enciclopedia della musica*, Vol. V, Torino, Einaudi, 2005, pp. XXIII-XLIV.
 — “Tipologie e universali”, in *Enciclopedia della musica*, in Jean-Jacques Nattiez et al. (éd.), *Enciclopedia della musica*, Vol. V, Torino, Einaudi, 2005, pp. 331-366.
- NATTIEZ, Jean-Jacques, *Il discorso musicale*, Torino, Einaudi, 1987.
 — *Il combattimento di Crono e Orfeo*, Torino, Einaudi, 1993.
- POWERS, HAROLD S., “Mode”, in *The New Grove Dictionary of Music and Musicians*, ed. by Stanley Sadie, vol. 16, London, Macmillan, 1980, pp. 775-860.
- ROUGET, Gilbert, “Preface”, in Constantin Brăiloiu, *Problèmes d'ethnomusicologie*, Genève, Minkoff, 1973.
- RUSSELL, George, *The Lydian Chromatic Concept of Tonal Organization for Improvisation*, New York, Concept Publishing Company, 1959.
- SHARP, Cecil James, *English Folk Songs from the Southern Appalachians*, London, Oxford University Press, 1932.
- SHARP, Cecil J. & CAMPBELL, Olive, *English Folk Songs from the Southern Appalachians*, London, Putnam, 1917.
- STUMPF, Carl, *Die Anfänge der Musik*, Leipzig, Verlag von Johann Ambrosius Barth, 1911.